



MAGAZINE

PRICE TWOPENCE

APRIL 1958



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FRONT COVER: *The Backs at Cambridge*, by Betty Pasley (Head Office)

OUR CONTRIBUTORS



Sidney Rogerson joined I.C.I. from the Federation of British Industries in 1930. In 1937 he was entrusted with the formation of the Central Publicity Department and remained in charge until 1952, when he was borrowed from the Company to supervise public relations at the War Office. He left the War Office in 1954 and retired from I.C.I. the same year, to set up as a P.R. consultant on his own account. Mr. Rogerson is the author of several books, *Our Bird Book*, illustrated by Charles Tunnickliffe, R.A., being outstandingly successful.



W. M. Steele, an Australian, was for many years employed by Elder Smith & Co., agents for I.C.I.A.N.Z., and was in charge of the sale of the Company's products in Western Australia. In 1954 he and his family went to live in Italy but two years ago moved to England. Mr. Steele now works in the Engineering Department of Paints Division, Slough.

'Terylene's' Inside Story

Everybody knows something about 'Terylene' from the outside because of its general use for clothing. But of the struggles, the planning, the anxieties and the risk-taking that have attended this huge endeavour your little has so far been revealed. Here the chairman of Fibres Division, Dr. Caress, answers some searching questions.

EDITOR: *Let's go back to the beginning. I think we all know the story of how Rex Whinfield and J. J. Dickson discovered 'Terylene' way back, I believe, in 1941, with little more equipment than a laboratory bench and a test tube. Now, Professor Jewkes has recently published a book in which he maintains that of the great discoveries of the twentieth century more are to be attributed to the lone wolf than to the teamwork of a big company organisation. What category would you place Whinfield's discovery in?*

CARESS: Undoubtedly lone wolf. It is true that Whinfield was working for a large company, and that is presumably why Professor Jewkes included 'Terylene' as a team discovery. However, Calico Printers' Association, for whom Whinfield was working, are essentially printers, dyers and finishers of fabrics and not fibre manufacturers. Whinfield came to C.P.A. and said in effect: "I think I am on to something which is off the beaten track. May I be allowed to continue?"

In due course he was given a pretty free hand by the C.P.A. in his choice of work—much to the credit of that company and, as it proved later, much to their advantage. From 1935 onwards he began to turn his thoughts in the direction of synthetic fibres, inspired, he says, by his previous collaboration with C. F. Cross, one of the inventors of viscose rayon. Eventually, by a brilliant bit of thinking, he concluded that a certain line of research might repay further investigation and went ahead off his own bat. It was individualism at its best.

EDITOR: *How then did I.C.I. get in touch with Whinfield?*

CARESS: I will try to pick out the important bits of this

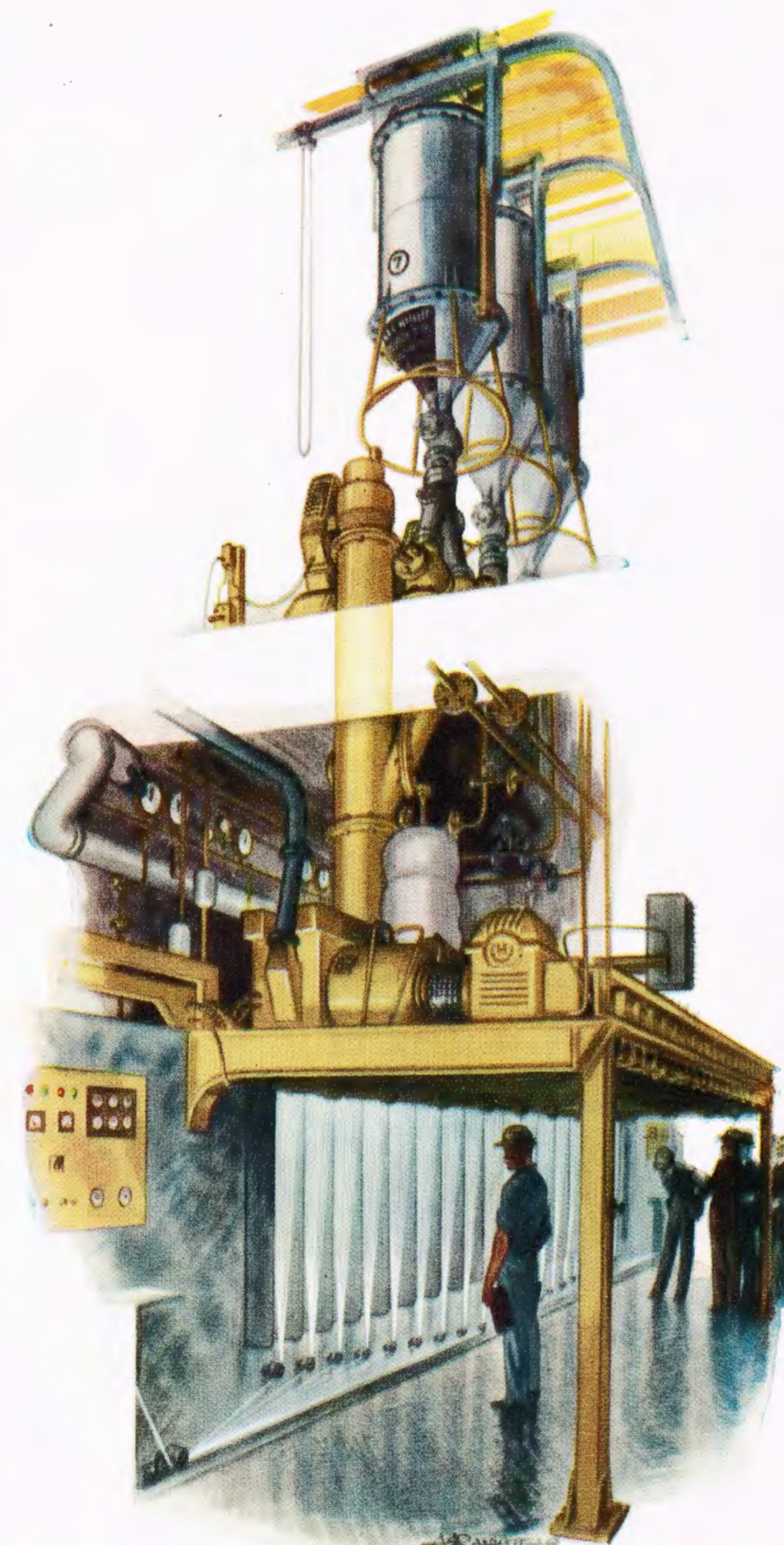
fairly long story. First of all, I.C.I. was already in the organic polymer field, which includes 'Terylene'. We had discovered polythene and 'Perspex' and knew about nylon as licensees of du Pont. Then in 1943 it was decided that I.C.I. should consider going further into the man-made fibre field.

A crucial meeting was called on 23rd September that year by Mr. Lutyens, who was then I.C.I. Development Director. This meeting recommended that a special Fibres Development Department should be set up in the Plastics Division. Mr. Osborne, now the Production Director of Fibres Division, was transferred from Alkali Division for this job. This department set about evaluating candidates for fibre-making—one of the candidates was polythene, incidentally—and got on to what is now 'Terylene' through the Ministry of Supply.

EDITOR: *How did the Ministry come into it?*

CARESS: During the war the 'Terylene' patent, like many others, was declared secret by the Ministry of Supply, to which Whinfield had then been seconded, and that Ministry naturally wanted to see whether the material could be developed in time to help the war effort. And so they arranged for some further work to be done in the Government-owned Chemical Research Laboratory.

Eventually they approached I.C.I. However, by that time the war was drawing to an end, and I.C.I. said they would like to discuss the matter directly with C.P.A. The Ministry readily agreed—hence the all-important meeting on 10th February 1944 which is depicted on pages 112–113. It was at this meeting that I.C.I. first discussed with C.P.A. in the



'Terylene' staple spinning at Wilton—an artist's impression. Polymer, fed from the hoppers above, is melted and pumped through holes in the spinnerets, emerging as tows of many hundreds of filaments. Several of these tows are collected into a larger tow for subsequent processing.



P. C. Allen (I.C.I.) G. S. Hibbert (C.P.A.) N. J. L. Megson (M.O.S.) W. F. Osborne (I.C.I.)

Reconstruction of the vital meeting between I.C.I., Calico Printers' Association, and officials of the Ministry of Supply when it was first suggested that I.C.I. should take a part in 'Terylene' development



Dr. Roffey (M.O.S.) L. A. Lantz (C.P.A.) J. R. Whinfield (M.O.S.) N. G. McCulloch (C.P.A.)

Reconstruction of the vital meeting between I.C.I., Calico Printers' Association, and officials of the Ministry of Supply when it was first suggested that I.C.I. should take a part in 'Terylene' development

presence of M.O.S. officials the possibility of taking over the development of a discovery which was quite outside C.P.A.'s line of country.

EDITOR: *When did the I.C.I. Board first decide to put money behind 'Terylene'?*

CARESS: The decision to build the first commercial plant at Wilton was not made until the end of 1950, but before that the Company had voted progressively larger sums for research and development work in the Dyestuffs and Plastics Divisions. By the time the first plant came into operation about £5m. had been spent on this work, including the operation of pioneer plants and the market appraisal of the fibre.

This had not got very far in 1950, and I can well remember the heart-searching that went on in preparing the supporting document for the Form A for the first Wilton plant. As a managing director of the Plastics Division I was responsible for editing it, and we did our best to point out the risks of the venture as well as the outstanding potentialities of 'Terylene.' The Board was asked to sanction the spending of about £10m. on this plant, but it was recognised in the report that the decision might have to be reviewed during the first year of design. It was a very big

decision. I do not think that any nationalised company could ever have taken it—at any rate anything like so early.

EDITOR: *And where did all this money go?*

CARESS: As I said, £5m. went into development work before the first plant ('Terylene' I) was ready to start up.

EDITOR: *That is a lot of money for development—where was it done?*

CARESS: Principally in two Divisions. At Blackley and Huddersfield by Dyestuffs Division, who undertook the chemistry and development of the making of intermediates and polymer, since they were already experienced in this kind of organic chemical operation and in particular were responsible for the making of nylon intermediates and polymer. And at Welwyn and Hillhouse by Plastics Division, where we carried out research and development work on the spinning of polymer into fibres.

EDITOR: *I suppose, too, you had a mass of trials and tests carried out by textile firms willing to play ball?*

CARESS: Yes, all that was done at the same time. Before putting up 'Terylene' I (a £10m. job) we had to go through the pioneer stage. We wanted to make sure of three things. First, that we could make the

fibre. Secondly, that the textile people could use it. And, thirdly, that 'Terylene' was as good in practice as we thought it was from its chemical structure and our research and preliminary evaluation work.

EDITOR: *I can well see why development was a long job. But even so, if I am right in thinking that the first sod of 'Terylene' I was turned in May 1952, eight years is a long time for development.*

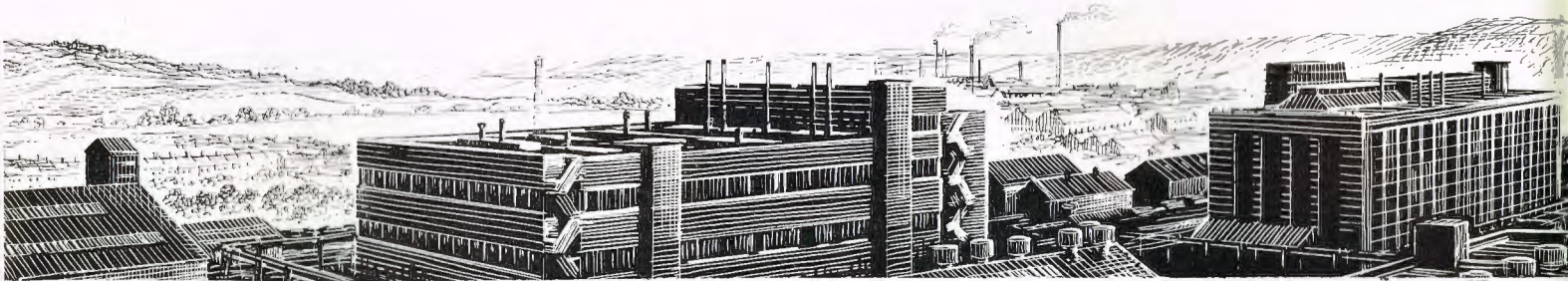
CARESS: Don't forget the war. The Ministry of Supply first thought of 'Terylene' as part of the war effort. With our experience of the time and effort required for a development of this magnitude we said, in effect, "Impossible—forget it!" We ourselves, except for Osborne's then tiny team at Welwyn and the corresponding team at Blackley, proceeded to forget it too. There were more urgent things to do.

It was not until the war was over that we got down to the development side really seriously. And another thing. Not until after the war could one get the equipment to build even a pilot plant.

EDITOR: *I get the picture. Now let's take a jump to more recent years. You order 'Terylene' I. You spend £10m. on this plant, which you have designed yourselves.*



Birthplace of 'Terylene.' The simple research laboratory at Accrington where Whinfield, working for Calico Printers' Association, first made a few strands of the fibre.



Huddersfield Works of Dyestuffs Division, where the pilot plant for making 'Terylene' intermediates and polymer was set up

This first £10m. plant makes 11m. lb. of 'Terylene' a year, in other words nearly £1 capital invested for every pound of 'Terylene' a year. How do you have sufficient confidence that, when this vast sum is spent and when all is said and done, you can actually sell the stuff?

CARESS: A fair question. One must frankly admit that in the early days the first sales forecasts were largely an act of faith. We had fairly good evidence on about a dozen uses for filament yarn, and the analogy of nylon to go on to support about half the proposed output. On staple fibre there was a certain amount of evidence from America, where the development had started off a little faster, being less hampered by post-war difficulties, but little practical evidence of our own at that time.

We knew—or believed with good reason—that we

had an outstanding fibre. 11m. lb. a year may sound a lot, but in fact it is only $\frac{1}{2}\%$ of the total annual fibres consumption of the British textile industry. We said to ourselves, first, that if we have as good a thing as we believe, surely we can capture $\frac{1}{2}\%$ of the market. Secondly, we cannot go smaller, because a smaller unit would not be economic. In fact, a smaller plant could never get us out of the red. The capital cost and overheads in relation to output would have been too heavy.

EDITOR: So you began largely with faith and guesswork. Are you more scientific—or should I say rational?—in your approach to sales forecasts today?

CARESS: Yes. I think we can claim that we are. Indeed, we are rather proud of our market research organisation. There are only about half a dozen people in this department specifically employed full

time on this work, but a number of other people are consulted, and in fact one of the more important duties of the Division Board is to make sure that our market forecasting is as good as it can be. I would say that the market research section do a great job.

EDITOR: How do they set about it?

CARESS: There are many methods of approach, but the most useful at this stage of the development is the end-use method. There are more than 100 important end uses, and we start by finding out as much as we can about



First meeting of the 'Terylene' Council, forerunner of what is now the Board of Fibres Division, in 1951. Back row: Dr. E. D. Kamm, G. F. Whitby, A. Renfrew, Dr. R. Hill, N. G. S. Coppin. Front row: Dr. D. Traill, Dr. F. J. Siddle, Dr. A. Caress, Dr. R. Beeching, W. F. Osborne.



Hillhouse Works, near Blackpool, where the first pioneer 'Terylene' spinning plant was established in 1949

each particular use, how many pounds of fibre are used a year, what fraction of this could be replaced by 'Terylene,' what the figure should then be divided by because the new product would be longer wearing, and whether the price range is right for full penetration of the market or only into the top income bracket.

When you have collected your data and you have decided which market should be penetrated and how soon, you draw up sales forecasts for a number of years ahead for each particular use. It is the combination of all these individual sales curves (from which all overlapping must be eliminated) that gives the final total sales forecast curve.

EDITOR: Quite a job! Has the sales forecast ever gone seriously wrong?

CARESS: Individual end-use forecasts have, of course, gone wrong. For instance, we over-estimated the use in the heavy woollen type of men's socks made from staple fibre. Nylon and 'Terylene' stretch socks made from bulked filament yarns came in and completely upset our forecasts. But the general sales forecasts have gone very smoothly. Sometimes we have been behind and there has been a lag, but we are always catching up. Recently we have even been ahead, particularly on the worsted development, where the use of 'Terylene' mixed with wool for women's skirts, men's sports trousers and suits developed faster last year than we had expected.

Of course, we not only need to estimate what can be sold eventually for a particular end use, but how much we can sell this year, next year and so on. This involves a lot of detailed research and technical service work in collaboration with customers and also a well-thought-out programme of promotion and publicity to make sure that as far as possible the public knows what it is buying and the material is there to be bought at the right time.

EDITOR: That is a fine record. Nevertheless, I cannot believe you have been without some pretty considerable

headaches. Nothing ever goes quite to plan. What about all those years before the break-even point was reached, when 'Terylene' must have been very substantially in the red, to the tune of several millions?

CARESS: If you are expecting me to discuss the exact break-even point I am afraid I cannot oblige. But I can say that the business of getting out of the red and keeping out of it is one of the niceties of planning. If you are on to an expanding market you always have to be thinking of increasing your plant capacity.

This has to be done by jumps. Thus, we jumped from 11m. lb. to 22m. lb. a year. We are now rounding off to 30m. lb. a year, and we are starting on an extension to 50m. lb. a year, to be ready in 1960. We are also considering another spinning plant—in Northern Ireland—for production by about 1964. If you make a jump too soon, you will, with all those millions of pounds' worth of plant carrying depreciation but not selling to capacity, be in the red much longer than if you make the jump too late and have a smaller plant working flat out.

It is a delicate and important calculation: not to be too forward with too much capacity in hand, and not to be too late with too little, in which case although you may be making good profits you could be losing business to competitors because of inability to satisfy the market.

EDITOR: Sales forecasting must, therefore, be tremendously important to you. I can see that. About how far ahead do you have to plan?

CARESS: That of course, depends on what you are planning. If you are looking at the ultimate potential market you may have to be thinking as far ahead as ten to fifteen years. If you are planning the next plant extension you are looking ahead about five years—say three years to build a plant and two years to get sales up to full plant capacity. If you are thinking of developing new and important processes you must look ahead a little further than that. I suppose seven years is a good average figure to keep in mind in planning research.

(Continued on page 121)

People and events . . .

More Money for Good Suggestions

BIGGER awards for good suggestions made under the Suggestion Scheme are likely soon.

Ways and means of injecting fresh life into the scheme have been discussed at the last two Central Councils. The basis for discussion at the November Council was the report of a special committee set up to examine the scheme. This committee's report has now been approved in principle by the I.C.I. Board, and Divisions have been asked to put into effect as many of the improvements as they can.

One of the main improvements recommended is to raise the amount of awards for "suggestions which show thought." On the other hand, the committee considered that what it calls the thirty-shilling attitude should get short shrift—in other words, that trivial suggestions should get no award at all.

Suggestions Officers to administer the Scheme locally are also recommended. They would be responsible for a general "gingering up" of the Scheme but would not adjudicate on suggestions.

* * *

The smaller awards, the committee says, should be made at the discretion of plant managers in consultation with their foremen. If they considered the suggestion worth a further award they would forward a recommendation to a higher level of works management. In this way the day-to-day running of the Scheme would be kept in the hands of the men most concerned with it.

At the moment about 80% of the suggestions adopted in I.C.I. are valued at 30s., and only about 0.1% at £10 or more. The average award is in the region of £1 17s. A survey of 223 British industrial firms made by the

Industrial Welfare Society for the year 1955 showed their average award to be £2 18s., and a comparable American survey gave a figure of \$30.22 (about 10 guineas).

A Beaver for Work

IN the last seven years I.C.I. (India)'s total sales have risen by over 50%. In the same period I.C.I. (India) has gone into partnership with Indian capital to manufacture explosives, dyestuffs, polythene and paints on a large scale.



Mr. Harris

The drive and energy to push this considerable expansion programme along have come from a shrewd Scot with the reputation of a beaver for work, **Mr. Norman Harris**. As chairman of I.C.I. (India) during these seven years he can look back, when he begins his retirement this year, on some great and solid achievements.

He joined the Company in 1927 as an accountant, and as so many accountants do he rose rapidly in the business. But unlike many people who make a success of business he also made a success of his human relationships. He has a flair for getting people to work wholeheartedly and happily for him. His many friends will remember his

great personal charm, which has stood him in good stead in knitting together a large staff of Indians and Europeans scattered over a vast sub-continent.

Many tycoons boast that "anyone can come and see me." In Norman Harris's case it was quite true, and everybody could count on genuine sympathy for their personal problems. During his term of office he has made company-wide improvements in the organisation and at the same time improved the pay and conditions of the employees, especially the factory and clerical workers.

When Mr. Harris was not travelling about the country by air his house became almost a hotel for visitors, and no one who has been to 24 Alipore Road will forget Josephine Harris's skill as a hostess. They will both be missed in the Company and in the life of the British community in Calcutta.

On, Stanley, On!

AN unsolicited testimonial appears in a report from the Oxford and Cambridge expedition to South America, whose members are dressed in 'Terylene' from top to toe. One member of the expedition, **Stanley Jeeves**, had a fall at the top of the 9000 ft. mountain of Roraima on the British Guiana/Venezuela border. He injured his ankle badly and had to crawl down the mountain, mostly on his knees but in particularly difficult places on the seat of his 'Terylene' trousers.

It took him ten hours, and the expedition's leader, **Adrian Cowell**, comments: "Two remarkable features of this episode were the occasion on which Stanley, in exhaustion, crawled over a snake which was apparently very



poisonous without noticing it, and the extraordinary way in which his trousers stood up to the wear and tear. He is wearing them today. They haven't been mended and they still have their creases—a wonderful recommendation for 'Terylene'."

We are happy to say that Stanley Jeeves himself is none the worse for the experience.

Australian Scholars Arrive

THREE fortunate young Australians arrived in this country last month. They are technical graduates who have been awarded scholarships by I.C.I.A.N.Z. enabling them to spend two years as salaried employees at I.C.I. factories in this country.

Mr. P. R. Mitchell, a graduate in chemical engineering from Melbourne University, has gone to Heavy Organic Chemicals Division. He was captain of his university water polo team and received a full blue.

Another chemical engineer, **Mr. B. W. Walsh**, goes to Dyestuffs Division. He is a graduate of Sydney University, is interested in music and tennis.

Mr. R. E. Creswell, a civil engineer who graduated at Melbourne, has gone to Billingham Division. The Synthonia Club rugby talent scouts will be interested in him—he won his full blue at the university.

The oldest of the three is 22. All were picked for their distinguished academic records.

Tea-party in Chittagong

AFRAMED address of welcome arrived on **Sir Alexander Fleck's** desk from East Pakistan recently. It will remind him of an occasion that was

typical of his tour of India, Pakistan, Burma, Singapore and Malaya.

The address was originally read to the Chairman at a tea-party held in his honour by the Chittagong office of I.C.I. (Pakistan). In this the occasion was unique, for it was the first time that an I.C.I. chairman had visited Chittagong. Once considered a remote place, even by Asian standards, it is now developing rapidly and can be reached easily by air.

The I.C.I. office in Chittagong is a small one and the tea-party was an informal affair, held in a local hotel. Sir Alexander made a short speech, which was drowned at one point by the efforts just outside the window of one of the bands that are used in Pakistan for advertising. This merely provided him, when the noise had subsided, with a convenient peg on which to hang a few words about competition. In Pakistan and India this is now as fierce as anywhere. More than once in the course of his Asian tour Sir Alexander warned I.C.I. audiences that 1958 might prove a tougher year than 1957.

I.C.I. and British Railways

ONCE regarded as the most conservative of institutions, British Railways are using what are for them quite unconventional materials now that their £1200 million modernisation scheme is under way.

'Perspex' is being used for light fittings in new stations. 'Darvic' rigid

p.v.c. sheet is being used successfully for carriage ventilator grilles and light fitting reflectors, and trials have been made using it for complete carriage ceilings. Dyestuffs Division have co-operated with British Railways in trying out rigid and flexible foams for insulating refrigerator cars, for general insulation and for upholstery.

* * *

Quite unnoticed by the general public, millions of 'Alkathene' components are going into British Railways tracks. These are the ferrules, formerly made of wood, which give a firm seating to the large coach screws which hold base-plates to the sleepers. Eastern Region pioneered this innovation and now use many million 'Alkathene' ferrules a year.

The changeover to diesel railcars for many suburban services has brought large orders to Metals Division. For the first series of 226 cars, built at the B.R. Derby workshops, the Division prepared design suggestions and supplied nearly 1000 tons of wrought aluminium alloy products. They have had further orders for the second series of 91 cars, now being built at Derby at the rate of two or three a week. A third series of 124 is to be built soon. The Metropolitan-Cammell Carriage and Wagon Co. has also been using I.C.I.'s aluminium roof-members and cladding sheets.



One of the multiple-unit lightweight diesel trains now in service

New Do-it-yourself Colours

THE contemporary trend towards strong colours is catered for in the 1958 retail range of 'Dulux' Eggshell Finish and 'Du-lite' Emulsion Paint. Viridian, Chestnut, Marine Blue and Jasmine Yellow replace some of the pastel colours of 1957. There are also some attractive newcomers to the 'Dulux' Gloss Finish card: Zephyr (a light pink), Magnolia, Alabaster, Buttermilk and Jonquil.

The new colours for do-it-yourself decorators are taken from the much larger ranges offered to architects and painting contractors.

No Pottering

A MAN who retires from a demanding and complex job which has occupied most of his waking moments has a difficult decision to make. How will he fill his time?

He can potter. He can play with



Mr. Fraser

translation of the works of Marcus Valerius Martialis, which he expects to take him several years. He revels in the prospect of the discipline and hard work the task will impose on him.

Mr. Fraser has been Sales Controller since 1945. Before that he was commercial director of Dyestuffs Division, joint commercial director of Billingham, and first manager of the S.E. Sales Division. Looking back on his career, he is bound to admit that in no job he has done were the stakes so high or success so satisfying as when he was

local politics. He can take up a hobby. For Mr. E. M. Fraser, who retired from the post of I.C.I. Sales Controller last month, nothing so desultory will do. He is embarking on a

Director-General of Aircraft Production during the war.

The fortnight before and after D-day is engraved on his mind. He had made a personal promise to the Air C. in C. and General Eisenhower that an ambitious production target would be reached. The target was reached, despite some people's doubts, and Mr. Fraser was awarded the C.B.E.

Mr. Fraser joined Brunner-Mond in 1919 with the express purpose of getting to India, where his family had served in the Civil Service for generations. A malady of the eyes—a legacy of his war service—prevented this. Instead, he found himself in some rather dingy lodgings in Northwich.

It was the blackest period of his career. There was no training scheme—junior staff had to find out what was expected of them as best they could. He picked up a smattering of chemistry from his fellow lodger, Digby Lawson, but those months left him with a belief

NEWS IN BRIEF

New Australian Explosives Factory. I.C.I.A.N.Z. is shortly to begin erecting a £A.3 million explosives factory at Bass Point on the New South Wales coast, about 70 miles south of Sydney. All Australian-made commercial explosives at present come from Deer Park Factory.

First Ball. Clitheroe Sports and Social Club held its first ball on 28th March. 70% of the profits will be given to the Cancer Research Fund.

Ardeer Line. The I.C.I. branch railway line to Ardeer Factory was the subject of a recent article by P. W. B. Semmens in *The Railway Magazine*.

Accident-free. A.E. & C.I.'s Somerset West factory set up a new safety record in January, when the factory as a whole completed one million accident-free man-hours.

Heysham Extensions. Large-scale extensions to the Heysham fertilizer plant include two 135 ft. high absorption towers, each weighing 93 tons, for the new nitric acid plant. The 250 ft. tall guy derrick used to lift the towers into position was the one used for the reactors and stacks at Calder Hall.

First Award at Gomia. The first long service award ceremony of Indian Explosives Ltd. was held during Sir Alexander Fleck's recent visit to the Gomia Site. Recipient was Mr. Thomas Lyon, who started work as a boy in the box factory at Ardeer.

Meals on Wheels. A van given by Billingham Division has been handed over to the Billingham W.V.S. unit to help in a "meals on wheels" service for old people in Billingham.

Electrical Engineers' Exhibition. I.C.I. exhibits at the exhibition included silicone resins (Nobel Division); wrought products in titanium, niobium, zirconium and beryllium; 'Integron' finned tubing for nuclear power stations; and 'Durestos' laminated plastics for radar installations (Metals Division).

The Governor of Kenya has appointed Sir Arthur Kirby, East African Commissioner in London, to the board of the Magadi Soda Co.

'Terylene' Men Cash In. A safety bar devised by four 'Terylene' works fitters at Wilton, Messrs. L. Thompson, W. Copley, W. Jowett and S. Beckett, has earned them £50 under the I.C.I. Suggestion Scheme.

Help for the Blind. The Birmingham factories of Lightning Fasteners Ltd. have held collections for St. Dunstan's every week since 1946. The total collected amounts to more than £2300.

Resettlement Panel. The Minister of Labour has appointed Mr. A. W. Weir, Wilton Personnel Manager, to the Forces Resettlement Committee for the North of England. The panel has been set up to help regular members of the

Forces who will become redundant in the next few years.

Aid for Ceylon. The Australian Government has sent a gift of drugs to Ceylon to help fight sickness following the recent disastrous floods. The gift includes I.C.I.A.N.Z. 'Sulphamezathine' and Sulphaguanidine tablets.

The Sky's their Limit. Plans are afoot for the formation of an astronomy section of Wilton Recreation Club. Prime movers are several enthusiasts in Polythene Works headed by Mr. Fred Adkin, who is at present building his own telescope.

Japanese Polyester Fibres. Production by Toyo Rayon Co. and the Teikoku Rayon Co. under the trade name 'Tetoron' is expected to begin this year. Initial capacity will be about 10 tons a day.

8000 Mark Passed. Canadian Industries Ltd. now has over 8000 employees in 31 locations across Canada. Montreal, with 1466 in Head Office, warehouses and works, comes first.

Civil Servants' Victory. A team of 20 small-bore riflemen, including several county shots, drawn from four Divisions and Head Office, recently competed against a team from the Civil Service. Scores: I.C.I. 3931, Civil Service 3970. This was the first of several representative matches planned.

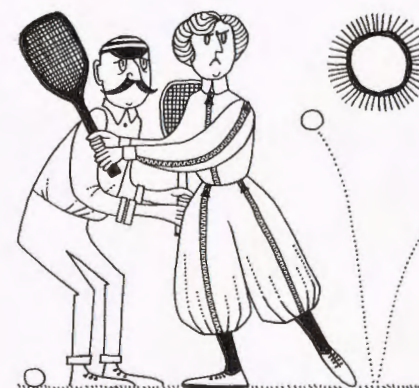
in the value of organised training which he has been trying to implement ever since, and not without success.

Mr. Fraser is succeeded as Sales Controller by Mr. J. H. Townsend.

Sacks and Bloomers

WOMEN readers of the *Magazine* sometimes complain of getting a raw deal. Here is something for them—a report from our fashion correspondent on the dress show which introduced Lightning Fastener's new fastener, the 'Nyzip,' to the press.

"Digby Morton, one of Britain's top twelve in the fashion world, Wimbledon fashion king Teddy Tinling, Susan Small, Dorville, Pringle and Simon Massey were among designers represented. Fifteen 'numbers,' ranging



from slacks and sweaters to a sequin-spattered sack, proved just how versatile the 'Nyzip' can be, and spectators were able to zip and unzip to their heart's content as the model girls paraded.

"Laurels for the most striking models in the show go perhaps to Teddy Tinling. He showed 'his and hers' tennis outfits—both, incidentally, in 'Terylene.' 'She'—if she has the courage—can wear Mr. Tinling's latest line for Wimbledon, the bloomer suit, with a matching zip-fronted jacket.

"Tinling also designed the Jekyll and Hyde dress which wound up the show. Basically a slinky, sequined white satin evening sack, the dress had six almost invisible 'Nyzips' at the hem and worked into the stole, which unzipped to show off a froth of rainbow-coloured frills underneath."

£55 million Customer

WHICH industry is I.C.I.'s biggest single customer? No prizes are offered for giving the right answer, but it may surprise some people.

It is the farming industry, at home and overseas, which during the past year bought about £55m. worth of I.C.I. products.

The farming industry in Britain, incidentally, has shown an increase in production per man employed of 70% during the past thirty years. This compares with 90% for the chemical industry, 60% for all manufacturing industries and 20% for mining and quarrying.

Not too old at 40

NOT everyone has the courage to change jobs at 40. For Mr. Arthur Ashton, a process worker at Paints Division's Stowmarket factory, the decision to sever his local ties and train as an I.C.I. work study officer must have been particularly hard.

He had a distinguished record of public service in Stowmarket. A Labour member of the Urban District Council for eight years, he had served as its chairman and as a J.P. for a year. On the U.D.C. his particular interests were road safety and the welfare of council house tenants.

Mr. Ashton was a Transport and General Workers Union shop steward—one of the first at the factory. His interest in work study stemmed from an appreciation course run by the union.

He is, incidentally, a competent amateur astronomer and has built his own telescope.

Dog Graduates

DECIDING this year for the first time that he would enter a dog in the Crufts Champion Dog Show at Olympia, Mr. John Parnell, Billingham Commercial Works Stores Section, won three first prizes with his three-year-old English springer spaniel Studley Dragoon. This triple success surprised Mr. Parnell, though he knew Studley Dragoon was a good dog. "He won over 100 prizes last year at north-east shows, and that made me hope we

might win something. To have won three firsts at our first attempt is really wonderful," said Mr. Parnell.

The classes he won were all in the English Springer Spaniel section and



John Parnell with Studley Dragoon

were for the best undergraduate dog—i.e. a dog which had not previously won at Crufts—the best postgraduate dog, and the special beginners' class.

Mr. Parnell is a member of the Billingham Synthonia Club Canine Section, and with Studley Dragoon has won the gun-dog cup at four of the section's last five shows.

"Post" Readers' Choice

LONG service anniversary lists, the advertisements, and the births, marriages and retirements were among the winners in a survey among the *Billingham Post* readers carried out at Billingham to find out what people most like to read in the "Post."

Among the random sample of readers interviewed, 88% said they always read the long service anniversary lists, which give names and personal snippets about employees qualifying for long service awards. Eighty-six per cent said they always read the advertisements, and 83% the births, marriages and deaths notices.

The popularity of personal stories shown in the above result was proved very strongly in the answers to other questions as well, but half the readers said they always read the special articles on the uses other industries

PEOPLE

An employee of I.C.I.A.N.Z. was one of three "Wallabies" from the Australian Rugby Union touring team who visited Billingham. The I.C.I.A.N.Z. man was **T. G. Curley**, the full back.

Philip MacNaughton, 19-year-old apprentice at The Kynoch Press, has been nominated Printing Apprentice of the Year by the Birmingham College of Art. The prize is a month's "Outward Bound" course at Ullswater in June, awarded by the Birmingham Master Printers' Association.

A second North East Counties amateur boxing title was won for Wilton Boxing Section last month by heavyweight **Derek Watson**, who works in Nylon Stores. The other title (light welterweight) is held by ex-Wilton apprentice **Teddy Carter**, who was called up for national service in March.

I.C.I.A.N.Z. chairman **Mr. K. G. Begg** has been appointed a trustee of Victoria's National Art Gallery.

Miss Mary Whitehurst of Dyestuffs Division Travel Department was invited by Eagle Airways to join the airline's inaugural flight of their Viscount service between Manchester and Hamburg.

The "Would-be" Golfers Cup at Limuru, near Nairobi in Kenya, has been won this year by **Mr. D. A. Tuttle** of A.E. & C.I. (East Africa). Runner-up was **Mr. G. R. Atkin**, an ex-member of the I.C.I. (India) staff, now retired and farming in Kenya.

Sir Walter Worboys, I.C.I. Commercial Director, has been reappointed chairman of the Council of Industrial Design.

Miss Pamela Bingham, 17-year-old clerk in Billingham Supply Department, has been appointed secretary of the Billingham district Youth Council.

Alan Kennerly, 17-year-old Synthonia junior soccer team centre-half, was picked to play for the England Boys' Clubs against Scotland at Newcastle.

Mr. L. F. Haber of Head Office Sales Control Department has written *A History of the Chemical Industry during the Nineteenth Century* (Oxford University Press, 45s.).

Dr. Tom Broadbent (Nobel Division) won the Scottish sabre championship held in Glasgow on 22nd February. He won the title from L. G. Morrison, to

whom three weeks earlier he had lost his foils championship title.

Mr. Charles Purvis (Billingham Division) won £32 when he appeared recently on the ITV programme *Double Your Money*. His subject was botany.

Kevin FitzGerald, head of C.A.C.'s Propaganda Department and spare-time broadcaster, has written another of his spy stories, *Trouble in West Two* (Heinemann, 13s. 6d.).

Neil Calder, former professional with cricket clubs in Northumberland and Durham, recently started work at Billingham and has joined the Synthonia cricket section as an amateur.

Winner of the C.I.L. Chemicals Division safe driving contest was salesman **G. A. Robillard**, who completed more than 60,000 miles accident free.

Mr. A. P. Cattle, Works Manager of Nobel Division's Westquarter Factory, has retired after 34 years with I.C.I. He was a staunch supporter of works councils, and had missed few meetings of Central Council since its inception. He was for some years chairman of the Forth Valley Productivity Association.

sergeant-major's brusqueness and a parent's kindly encouragement, he has moulded generations of Shrewsbury office juniors into highly efficient members of the Company.

Advanced Cookery

I.C.I. cooks and catering manageresses in the Manchester area have been



giving up spare time during the winter to attend a course on advanced cookery at Hexagon House. It is supervised by **Mr. F. R. Noakes**, Dyestuffs Division Catering Manager. Experts from Head Office and Metals, Nobel and Salt Divisions have given demonstrations.

The idea behind the course is to teach kitchen staff how to cook dishes for special functions and

for use in day-to-day menus as special alternatives. This does not mean that *Sole bonne femme* and *Crêpe Suzette* will be turning up on the menus every day. Mr. Noakes' feeling is that a sound training in *haute cuisine* has its effect even on the production of more homely dishes.

Au Pair

SEVERAL more people in Britain have shown interest in an exchange scheme for British and continental "I.C.I. children."

One of them is **Mr. R. A. Newbold** of Southern Region, who wants his son of 13 to stay with a French family this summer. In exchange he offers a holiday for a French boy, either this year or next, at his home at Henley-on-Thames.

Henley is a beautiful place, with splendid boating and swimming facilities, and is only 30 miles from London.

Another is **Mr. K. H. Lauder**, of Nobel Division's Research Depart-

ment, who seeks exchanges in France for his daughters Merran (14) and Hilary (19).

The Lauders live at Largs, a well-known resort on the Ayrshire coast of Scotland. Swimming and boating are available. Merran Lauder rides, swims, and is interested in dramatic art. Hilary is studying fashion design and has much the same interests as her sister.

Any offers from France, please?

NEW APPOINTMENTS

Some recent appointments in I.C.I. are: **Dyestuffs Division:** Mr. J. A. G. Coates (Personnel Director), Mr. J. D. Rose (Production Director, formerly Research Director), Mr. G. S. J. White (Technical Service and Development Director, formerly Technical Service Director), Mr. R. S. Wright (Research Director, formerly Production Director). **Head Office:** Dr. M. A. T. Rogers (Research Controller), Mr. J. H. Townsend (Sales Controller). **Northern Region:** Mr. B. D. Uttley (Sales Manager, Engineering Trades). **Pharmaceuticals Division:** Dr. J. Y. Bogue (Technical Managing Director). **Severnside Works:** Mr. L. W. Norfolk (Engineering Manager).

make of Billingham products. No one said he never read these articles.

More than half of the readers interviewed said they would be very interested to see reports of their own Works Council meetings, and this suggestion has now been put before the different Billingham Works Councils, and the scheme for a *Billingham Post* report on one meeting each month has been accepted by all but one of the Councils.

The survey was carried out entirely with the factory's own resources, with expert advice from the Statistical Section. Half the interviewers were works councillors and the other half staff members.

Mond Relic

WHEN **Mr. H. O. Foot** of Southern Region was talking to the landlord of his local inn at Sevenoaks one night the conversation turned to I.C.I. The landlord mentioned that he had among some oddments a medallion which he had acquired in a lot bought at a sale-room. He gave it to Mr. Foot as being of more interest to an I.C.I. man than to himself.

The medallion shows on one side a

profile of **Dr. Ludwig Mond**, founder of Brunner, Mond & Co. On the reverse is a summary of the various offices he held during his lifetime.

Alkali Division identify it as a funerary medallion struck after Dr. Mond's



The Mond medallion

death and circulated some two years later to a large number of friends and acquaintances. As to how it came to be in Sevenoaks, that is anybody's guess.

Dickensian Office

ARE there fewer "characters" in A.I.C.I. now than there were in the

good old days? Many people think so. The Midland Sales Region is certainly one "character" the fewer now that **Mr. E. Doyle-Jones**, the Shrewsbury Area Manager, has retired.

Restless, excitable, loquacious to a degree, a born raconteur (especially in the Liverpool vernacular), with decided views bluntly expressed, a man of strong likes and dislikes, warmheartedly generous—that is how they will remember him.

He started in the Liverpool Shipping office of Brunner-Mond in 1913 as a junior. The office was Dickensian in its discomfort except for the roaring great coal fires. The clerks wrote in copperplate, and used a hectograph to duplicate bills of lading that had been bought by the office boy with golden sovereigns. Cargoes of soda ash for Australia sometimes went in full-rigged sailing vessels, whose bearded captains signed the bills of lading while they downed their grog in dockside pubs.

Later Mr. Doyle-Jones joined the sales force. In 1934 he was put in charge of the new office at Shrewsbury. Since then, with a judicious blend of a

'TERYLENE'S' INSIDE STORY (continued from page 115)

EDITOR: *Talking about fundamental research work, have you anything up your sleeve you can talk about?*

CARESS: We are always looking at new fibres, of course, but on "Terylene" itself we are continually investigating new uses and new forms of the fibre and new and cheaper routes for making the chemical intermediates. Indeed, we discovered a new route for making the intermediate chemical terephthalic acid quite recently, but we were beaten to the post by an American company. We have made an arrangement with them which may lead to our using this important process in "Terylene" III.

EDITOR: *What sort of saving could come from a new and cheaper route?*

CARESS: I would not like to commit myself to a figure. The cheapest form of "Terylene," which is long staple fibre, sells at 10s. a lb. Savings in costs of the order of pence per pound are considered very seriously. This may not sound a great deal, but it is in fact pretty big money. After all, 1d. a lb. on last year's sales of 20m. lb. is a very big sum.

EDITOR: *Would lower 'Terylene' prices open up any considerable new markets now being held back by price considerations?*

CARESS: Nowadays, with continual inflation, the thing that matters is price relative to other fibres rather than the actual price in pence per pound. A fairly substantial fall in the relative price would open up new markets—for example in many industrial uses, including conveyor belting, ropes and fishing nets. I think we are just nearing the price point where most of the fishing net market could go over to "Terylene." Even the poorest of fishermen in

India are trying out "Terylene" nets, because it is plain to them that the long life of the "Terylene" net would handsomely cover its initial heavy cost.

EDITOR: *I can think of a lot more questions to ask you, Dr. Caress, but a line must be drawn somewhere. One last one. I notice that your advertisements never really make it clear in what respect the behaviour of 'Terylene' is different from the behaviour of nylon. I can understand and respect this diffidence. Nevertheless, could you perhaps just this once be a bit more explicit?*

CARESS: I think I can. One of the important differences between "Terylene" and nylon is that nylon stretches more easily. When you want a strong fibre that will not stretch you use "Terylene." That is why "Terylene" is superb for such things as conveyor belting and papermakers' felts. Conversely, nylon is better where stretch is required, and this gives it an advantage for example in women's stockings and certain types of ropes.

"Terylene" and nylon are also different in their resistance to chemicals, "Terylene" being best in resistance to acids and oxidising agents and nylon in resistance to alkalis. The great success of "Terylene" in curtain net springs from its resistance to sunlight as well as its "wash and wear" properties.

There are also subtle differences in warmth and drape. Perhaps the most important property in which "Terylene" excels among the man-made fibres is the property of resilience. The combination of crease resistance and pleat retention, which means that accidental creases soon shake out of a "Terylene" garment while pleats deliberately ironed in stay put, is one of the great advantages of "Terylene" garments.

THE AUTOMATIC CONTROLLER

By C. R. Evans (Central Instrument Laboratory)

Automatic control is vital to the running of a chemical plant. The modern control room, with its gleaming instrument panels and rows of recorders and dials, still relies on control by air pressure as did its cruder predecessors of pre-war days. The ingenious technique of a simplified pneumatic controller is here described.

THE average household in these days is sure to contain a few automatic controls. There is the thermostatically controlled immersion heater which helps us to maintain a compromise between the uncomfortably low bath water temperature and the insufferably high electricity bill. There are heat-controlled irons and toasters and, at the other end of the scale, the domestic refrigerator. And, of course, there are those convenient tanks, both small and large, which, with a little encouragement and protection from frost, will keep the water levels where we want them. The justification for all these gadgets lies in safety, convenience, and economy.

Industrial chemical processes have a similar need of automatic control. Temperature, pressure, liquid level, flow, and many other quantities have to be controlled, often within very fine limits. Thus a major (and often most impressive) feature of our modern chemical plant is its instrument panel. Much use is made of electronic devices, but most of our automatic controllers utilise pneumatic power, i.e. they operate by means of air pressure. A simplified controller of this type is described.

How does it work? This is best understood by considering first of all a specific case, say control of the temperature of a liquid in a vessel when the liquid is heated by passing steam through a coil. How would a human operator control this? You might say "Oh, just waggle the steam valve until the temperature is right," admitting, of course, that the waggle would have to be done continuously to keep the temperature just right. And you would be right. This is just what the automatic controller will have to do.

But there is more to it than that. If we analyse the human operator's job, we find that he starts with two pieces of information: (a) the actual temperature and (b) the desired temperature. Finding the temperature too low, for example, he could open the steam valve wide, and close it completely if the temperature were too high. But experience would soon teach him that much better control is obtained by relating the amount of opening or closing to the difference between actual and desired temperatures.

The device which replaces the operator must be supplied

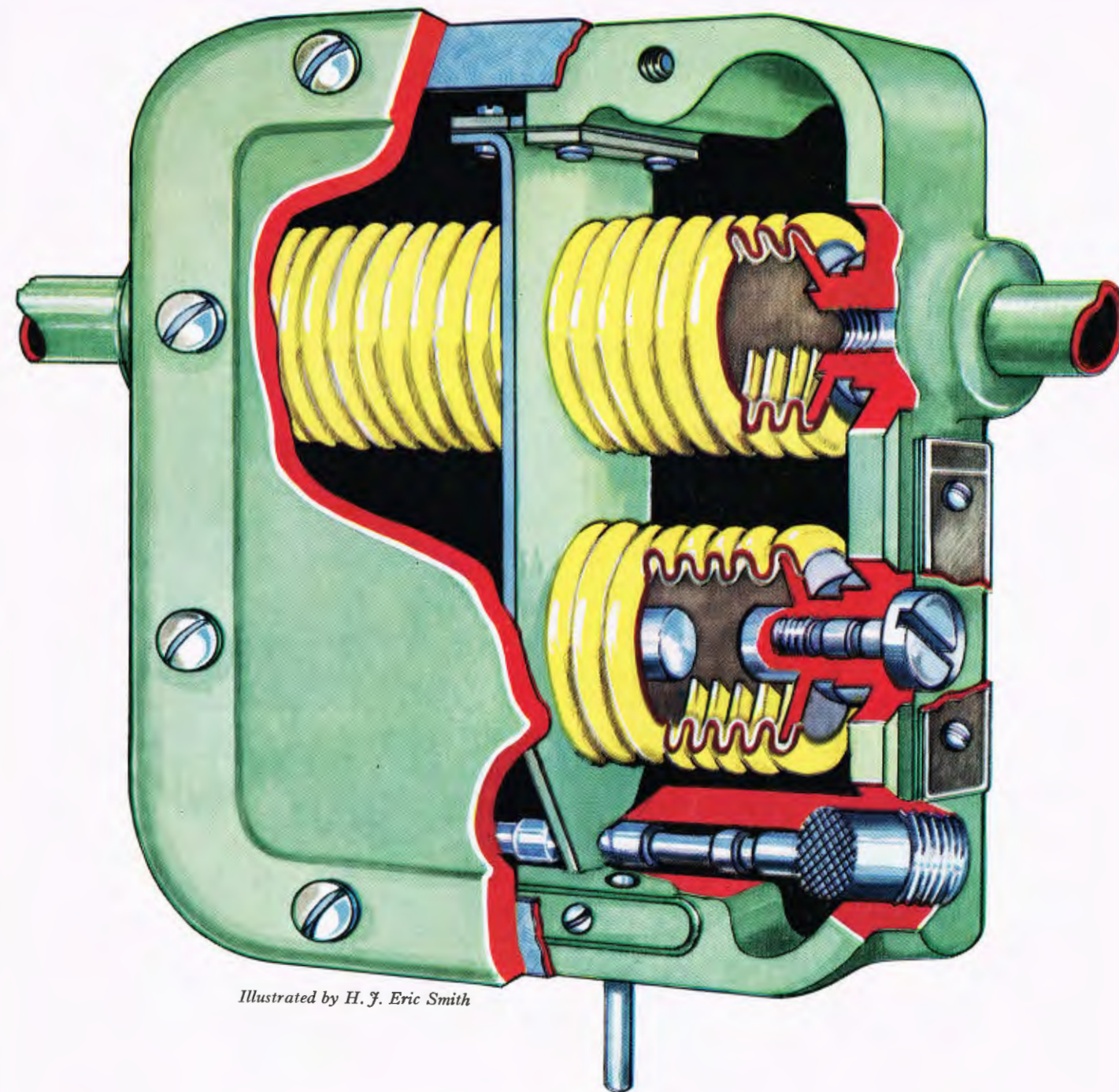
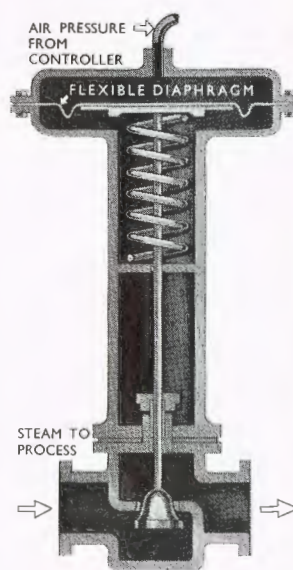
with the same two essential pieces of information: actual temperature and desired temperature. In the type of controller we are considering, the information is supplied as two air pressures, the first one from a device which produces a pressure varying with the actual temperature in the vessel, and the second a fixed pressure which we can set up according to the temperature we want. Thus we simulate the observed reading of a thermometer and the verbal instructions given to the operator.

Our controller, ingenious though it is, is of very limited capacity. It can only respond to air pressure.

Referring now to the diagram of the controller, we see the two air pressures applied to the two upper bellows on either side of the central arm, which is hinged at the top. This arm will be pushed to left or right with a force depending on the difference between the two bellows pressures. At the bottom end of the central arm are two tubes, placed so that a very small movement of the arm causes it to seal up the end of either one or the other. The right-hand or inlet tube is connected to the air supply, and the left-hand or outlet tube allows air to escape from the case.

Thus a little movement of the arm to the left will admit air through the inlet tube, seal off the outlet tube, and cause the pressure in the case to rise. Movement of the arm to the right has the opposite effect. Pressure in the case can be held steady by positioning the arm very near the centre, so that equal amounts of air are gained and lost through the two tubes.

To see how this central position can be held, let us consider what happens when the actual temperature is less than the desired one. Pressure in the upper left-hand



Illustrated by H. J. Eric Smith

bellows will be less than that in the right-hand one. This would cause the central arm to press against the left-hand tube, and pressure in the case would increase. As it does so, however, it begins to squash the third bellows, and this, being attached to the central arm, will eventually pull it to the centre position, at which the case maintains its pressure.

The greater the original difference between the pressures in the upper bellows, the greater will be the pressure reached in the case before this balanced condition is achieved. So the pressure in the case will be proportional to the difference between actual and desired temperatures. It remains only to make this pressure operate the steam valve, and the controller will perform automatically the

same actions which the human operator found necessary.

Our smaller diagram shows how this final function is performed. The greater the air pressure on the diaphragm, the more the spring is compressed and the valve is opened wider to admit more steam. This causes the temperature to rise, and the controller now observes that conditions are nearer to those desired, and reduces its action accordingly.

What we have described here is a fairly simple pneumatic controller, applied to a straightforward problem. We have seen that the controller simulates the actions of a human operator. Its activities, however, are very simple: the controller should not be considered as a "brain," but rather as a mechanical slave which will respond in a predictable way to a given set of circumstances.

Scavengers and Robbers

By Sidney Rogerson

Robber and scavenger, virtually without a friend, the crow is none the less a bird of great cunning and intelligence. Rook and jackdaw, hoodie and carrion, raven and chough, jay and magpie—all are readily distinguished one from another, and each has his individual characteristics.

Colour reproductions from Gould's "Birds of Britain"

THE black bird who nipped off the Queen's nose as she was hanging out her washing was, I would hazard, almost certainly one of the crow family. Crows, whatever their colour, have one characteristic in common—they are all robbers; and robbers of an unpleasant character. Not only do they rob for the sake of robbing, but they will eat anything that their crops can convert into food—and some things which it doesn't seem they could.

Crows are indeed birds of unlovely habits—scavengers, raiders of smaller birds' nests, stealers and suckers of eggs, some of them not above pecking out the eyes of newborn lambs or ailing ewes, others ready to gorge themselves on any stinking corpse or other carrion. As such every man's hand is against them, and the more destructive and unwelcome their habits, the more they have been forced to rely on cunning and the further they have been banished from among the dwellings of man. Yet they survive. They have learned that safety lies in frequenting the wilder places of the countryside, or of so siting their nests that they are relatively inaccessible or very difficult to find.

A frequenter of wild places is the mighty raven, biggest of the corvines. In England and Wales you are seldom likely to see him in the wild state, although your editor has two pairs within 200 yards of his farm buildings. But that is in Ireland. Elsewhere in the British Isles the raven, with its gruff bark and its hatchet of a beak, survives only in mountains and distant corners. The best known of our ravens are the tame ones which appear to be helping the yeomen to patrol the precincts of the Tower of London and to keep visitors in order!

The rook is the most common of British crows. He is also the most conspicuous, belonging to a gregarious

family that moves about in flocks. He prefers to nest in colonies close to the homes of man, siting his habitation in the thin, wind-swung branches of tall trees. These, though conspicuous, are at least safe from the depredations of nest-robbing youths or marauding cats.

Now the fact that the rook chooses to nest among men is, I fancy, because he has the best reputation of members of his tribe and is far more of a vegetarian than the rest, seldom bothering to rob small birds. The charge against him is that he does a lot of damage in cornfields; and this cannot be gainsaid, even though many of the plants he destroys may have often already been attacked by wireworm or other pests, and it is this tasty morsel which the rook is after. The rook is unmistakable even among crows by his bald or featherless face and throat, which form a sort of elastic pouch which the parent birds stuff with food to feed their young. (Incidentally, they go on feeding the young long after these have left the nest.)

If the rook is the most gregarious of the crows the jackdaw comes a good second, being all for company and seldom to be found nesting on his own.

The jackdaw is in many ways like a smaller rook except that he is more perky and not so shabby-looking, with a nice round grey head instead of the rook's ugly long beak and bald cheeks. His character is a little better than the rest of the crows, though we may remember the daws in the grim epitaph of François Villon, which, haunting the medieval gallows of Paris, "have picked out our eyes and . . . ta'en the hairs that in our heads and eyebrows grew . . . and where the birds have fed, our cheeks are pocked like thimbles."

No; the jackdaw, for all his robust friendliness, has



The rook (corvus frugilegus) is perhaps the most familiar of the crow tribe, owing to its habit of nesting in communities—up to 200 or more nests in one rookery. Can be distinguished from other crows by the bare patches of greyish-white skin on its face.



The hooded crow (*corvus cornix*), or the "hoodie," is the biggest pest of the lot; its favourite food the eggs and young chicks of other birds, particularly birds like the pheasant, partridge and grouse, which nest on the ground.

a sinister side to his character. Yet he is an engaging bird, of great intelligence. The jackdaw likes especially the ruins of buildings or old trees for his nesting site, and is a tireless builder. I know an ancient hollow tree where a pair of jackdaws nest each year. They enter by a hole about 12 ft. from the ground and have contrived a habitation no doubt to their entire satisfaction by dropping twig after twig until they have filled the hollow trunk right up to within a few inches of their entrance hole. Unlucky for you if they pick on your chimney as a nesting site!

But there is another and more pleasing side to the jackdaw. Those who have read Professor Lorenz's

fascinating book *King Solomon's Ring* will already know this, but for those who do not I take leave to quote some of his opinions.

"Few birds—indeed few of the higher animals—possess so highly developed a social and family life as the jackdaw. Accordingly few animal babies are so touchingly helpless and charmingly dependent on their keeper as young jackdaws." Jackdaws in fact make wonderful and intelligent pets, but Lorenz sounds a warning. "The male jackdaw . . . continually wanted to feed me with what he considered the choicest delicacies. Remarkably enough he recognised the human mouth . . . as the orifice of ingestion, and was overjoyed if I opened my lips to him, uttering at the same time an adequate begging note. This must be considered as an act of self-sacrifice on my part, since even I cannot pretend to like the taste of finely minced worm, generously mixed with jackdaw saliva."

Lorenz further records that crows—black by deed as well as by colour—are disturbed by black objects, particularly black flapping objects. But he writes at such length and with such fascination that I would recommend you to read him for yourselves. One last piece of information: "Jackdaws mate for life, becoming betrothed in the spring following their birth, but do not become sexually mature till twelve months later. Thus the normal period of betrothal is exactly a year."

The most detestable of the crows are the carrion crow and the grey or hooded crow. Prime scavenger that he is, the carrion crow will also kill, and is likely to be shot on sight. Perhaps because of this he is fortunately less common in England than he was once. The grey crow is the most persistent depredator of the lot, and his favourite food is the eggs and young chicks

The jackdaw (*corvus monedula*) is the smallest and liveliest of the British crows. Easily domesticated, it can imitate human voices, and has a weakness for hiding scraps of food and any bright objects which capture its fancy. It likes to nest in old buildings or in quarries.





The raven (*corvus corax*), the largest and rarest of the crows, measures about 26 in. long and has a wing span of over a yard. Has a reputation for being a bird of ill omen.

of other birds, particularly those that nest on the ground like pheasant, partridge and grouse.

So much for the crows bearing the Latin name *corvus*. But there are three other members of the crow family, all of them more brightly plumaged—the jay, the magpie and the chough.

The jay survives by carefully concealing his nest. But no matter how furtive and cunning, he cannot

resist proclaiming his presence by his scream of “*Craak, craak!*” One year I knew by these screams that there were jays nesting somewhere near, if not actually in, my garden; but in spite of the most energetic search we never found the nest until a young jay had fallen out of it. After that the liquidation of the rest of the brood was speedy.

The jay is a bad friend to the gardener. He will sneak into gardens very early in the morning and pick off a row of peas or broad beans in a few seconds. One old man I knew used to grow prize broad beans to enter at local vegetable shows. Monsters of their kind they were, and he spent hours watering, training and manuring them. Then one day a jay arrived, spied the luscious specimens with his cold blue eye, and cleared off the lot almost under the very eye of the disconsolate grower.

The gayest of the crows is the magpie. The magpie also makes a good and intelligent pet if you can put up with his thieving habits. He, like the jackdaw or the jay, can be taught to talk. Here, you would say if you have only seen him on his dipping flight, is a person clad in black and white as surely as Pierrot. But you would be wrong. Seen close up, the magpie’s black is a shimmering harmony of blues and greens. Indeed, in this sense there are no *really* black birds. Even the blackest-looking of the crows, like the carrion, is not black

but the purply blue-black of high-class writing ink.

The chough is of milder habits and seldom seen except in Cornwall and perhaps parts of Wales. He has red legs and a curved red bill and nests in cliffs by the sea.

Finally, it would be interesting to learn how many readers regularly see either ravens or choughs. Are there any I.C.I. establishments close to areas inhabited by either bird?

The carrion crow (*corvus corone*) lives up to the old saw “black as a crow” both in character and appearance. Similar to the rook but has a longer, more pointed bill. Although only 16 in. long, will attack even sheep.





Men with Ideas—3

Walter Wilcock

THE Wilcock blower is one of those simple ideas for saving time and money which might have occurred to anyone. But it didn't, until Walter Wilcock, a toolsetter at I.C.I.'s only pottery, Steatite and Porcelain Products Ltd., bent his brains to a small problem at Steatite's Stourport factory.

About a thousand people are employed in the factory making insulators of all shapes and sizes. Many of these are destined for radio and TV sets. One of them, a tiny tube-shaped pressing, was tiresome to produce. The moulding operation left some of the raw material, known as flashing, inside the tube, and this had to be removed from each tube by hand.

Walter Wilcock's idea has changed all that. Compressed air blows out the flashing as each tube leaves the die.

It was the first idea he had submitted and it brought him £750—one of the largest sums so far awarded under the Suggestion Scheme. Top of the list when it came to spending some of the £750 were labour-saving improvements for the kitchen of the Wilcocks' home on the Steatite estate.

Walter Wilcock hails from Atherton in Lancashire, but for the past twenty years he has been working for Metals Division. His first job was at the Witton 'Lightning' Fastener factory. Then war came, the production of zips was restricted, and he moved to the Steatite and Porcelain insulator works.

(Photos: Charles Scott)



BRAIN, BRAWN AND LOAD-HANDLING

By H. Hutchison (Nobel Division)

By substituting science for brute force in handling loads, Nobel Division has cut by three-quarters the number of strain injuries suffered by its employees. Here is the story of this remarkable achievement.

"HE was a strong man. How did it happen to him?" The question is often asked, and the answer is: "Very easily."

Most of us are careful when we choose machines to work for us. We are very much less careful when we do our own physical labour. That physical labour could be less exhausting, and the risks attending it much less severe, especially in industry, if a logical system of weight lifting, moving and handling were adopted.

The body is a machine which, when sensibly used, will give good work over many years without developing aches, cricks in the back and other discomforts. Habit, however, means that a great number of industrial workers are in some danger of suffering stress injuries because they misuse the machinery of their joints and muscles.

There have always been pains in the back and pains in the neck, but only in recent years has the so-called "slipped disc" become a prestige illness. This fashionable and painful complaint appears to develop very easily, or so it is said. It need rarely happen if care is taken in body movement, especially when lifting and handling weights.

There are three systems of manual handling. In the first, brute force alone is used, and the strong man heaving mighty loads thinks he can go on indefinitely abusing his arm, shoulder and back muscles. These muscles are over-developed and they have lost their elasticity, yet until he slips a disc or suffers a rupture the "Atlas" is never afraid.

The second, mechanical, method is more sensible. The powerful leg muscles are used along with a straight back to perform lifts. Although this method is better than the first, it still exposes the practitioner to stresses and strains. The success of the lift depends on the strength of the operator.

With the third method, men of small physical endowment can, if they practise the kinetic system, do much more work than the strong and unskilled. By using kinetics,

fatigue and subsequent injury can be reduced to a minimum.

That opinion is well borne out by cumulative fact. Since 1950 the number of strain injuries sustained in the handling and moving of materials has been cut back by three-quarters in Nobel Division. During the years of this marked improvement, kinetic handling methods have been demonstrated and taught to employees in Ardeer Factory and in other factories of the Division. Strain injuries were mostly sustained in the handling of sacks, cases and drums.

The principles of kinetic handling were evolved by Mr. T. McClurg Anderson, Principal of the Scottish Hospital of Physiotherapy, but Ardeer Factory has been the biggest experimental proving ground of the system's worth.

As far back as 1948 Mr. Anderson studied some manual handling operations in Ardeer and filmed them, and from the film he analysed movements to pinpoint the sources of strain. He made suggestions in line with kinetic principles.

This start was promising. Ardeer management, eager to reduce strain injuries, installed a physiotherapy section in its Medical Department. A full-time physiotherapist, Mr. R. J. McD. Maxwell, was engaged to introduce kinetic training on a large scale, and also to give physiotherapeutic treatment to employees who would benefit from this skilled attention.

Each operation was studied, and faulty techniques which had grown by habit were detected and new systems of handling, founded on kinetic principles, were evolved to replace the old habitual methods. Men and women had to be convinced that the new ways were better.

To help in this work it was found necessary to train demonstrators. Two men, Mr. W. Andrew and Mr. R. McCulloch, neither of whom is heavily built, showed interest and great aptitude. They were trained, and the work of replacing old methods, which exhausted far more energy than was necessary, started in earnest.

Instruction courses began. Twice each week classes attended by thirty employees were held—they still continue. At the class a lecture is given and the effects of wrong lifting and moving methods are explained. In contrast the lecture shows how kinetics will reduce the chances of strain from sudden jerks, and will prevent long-term cumulative strain which occurs from years of wrong muscular habit. Instructors show every point by example, and members of the class are urged to have a go.

Over ten thousand Ardeer men and women in the last five years have had this basic training in the kinetic system, but the lecture is only part of the course—an introductory part. The physiotherapist and his instructors study the problem of handling in the departments. After examination of jobs, they evolve new strain-saving movements based on kinetics. The new methods are then demonstrated on the shop floor by the instructors and tuition is given.

When tuition is completed and employees are trained in the particular handling operation, the essential movements and postures are drawn on simple posters, and these are exhibited in the working places. They act as reminders of what should be done, and they indicate wrong methods as well as showing the better kinetic way.

The idea has caught on, and its advantages have been realised on the shop floor. Many requests have come from Ardeer Factory departments to have their methods analysed and advice given. Other industries have learned of this work and are anxious to introduce kinetic methods, because the number of absences caused by strains is very large indeed.

What is this kinetic system? The proper use of timing, rhythm and body weight. Try picking up a penny from the floor. The chances are that you will adopt the "touch your toes" method, with straight legs and a much-bent back. You can damage yourself this way, because all the vertebrae on the spine are extended and exposed to strain—discs can slip!

Now approach the penny one foot ahead of its neighbour. Lower the hand by relaxing the knee, keep the chin tucked in and your spine straight. The penny can then be picked up the easy kinetic way, and as you rise, the powerful leg muscles thrust you upright and forward. That is a kinetic movement: the back is not bent, but straight throughout. The bones of the spine are in a locking position and the muscles relaxed. A spinal injury under these conditions is extremely unlikely. Mr. Maxwell regards kinetics in manual handling as the Judo of lifting. Here a successful attempt has been made to substitute skill for brute force. To quote the instructor: "You don't get medals for killing yourself."

A knowledge of kinetics should (a) enable the worker to stay young physically, (b) cut down muscular fatigue, and (c) help to maintain vigour throughout the entire shift.



1 Approach one foot ahead of the other.



2 Lower the hands by relaxing the knees.



3 Chin in, back straight, diagonal handhold.



4 Arms relaxed and into side.



5 Follow through, carry box low.

Handling a 50 lb. case by the kinetic method

SOMETHING OUT OF NOTHING?

By John Lewis (Head Office Research Department)

Certain physicists hold the theory that entirely new matter is continually coming into existence from literally nowhere in very small quantities throughout space—the theory of “continuous creation,” as it is often called. This fascinating theory is here explained in simple language.

THE rule that you cannot get something out of nothing has been held for centuries to be the foundation not only of common sense but of science too. It is the fundamental principle on which all chemical plant is built, for instance. For everything that is to come out, something must go in. There must be a balance of materials, and a balance of energy too. Scientists have referred to the law of conservation of matter and the law of conservation of energy as the basic principles on which all their thinking has been built, and they have used them as the means of discrediting all forms of wizardry and hoax. In physical processes neither matter nor energy can be created or destroyed—so ran the unbreakable rule.

The discovery of atomic energy may have seemed for a while to threaten the rule, for in the explosion of an atom bomb matter is destroyed. What happens here, however, is simply that matter is converted into energy—in fact, the great discovery on which the use of atomic energy rests is that matter is really a special form of physical energy, a concentrated form, as it were. There is no real breaking of the rule, therefore—it merely needs to be reworded so as to state that the total quantity of matter-energy always remains the same.

Obviously in all ordinary processes, where there is no change of matter into energy or vice versa, this comes to the same thing as the old rule, but the new rule expresses the fact that even in the process of atom-smashing you cannot get out more than you put in in some form or other.

What, then, is the meaning of this new idea some of the younger physicists at Cambridge are beginning to talk about, the idea that matter is being continuously created? It is emphatically not meant to be a mystical or religious idea—about that sort of question these scientists offer no opinions; nor can they, as scientists. No; it is as a theory

of physics that they are putting the idea forward. What is their reason for doing so?

The first thing to be said is that there is no question of anyone having *discovered* new matter coming into existence out of nothing. There have not been any I.C.I. plants turning out sulphuric acid or chlorine without using any raw materials! No; the theory only holds that new matter comes into existence in extremely minute quantities. It states that there is one entirely new atom in a space the size of the Empire State Building every century. Or, to put it in other terms, there is only one-millionth of a gram of new matter in a volume the size of the whole earth after ten million years have gone by. So even if the theory is true no one is going to make much profit from it.

The reason these young physicists believe this new matter is coming into existence is that they hold that something must be happening to balance the expansion of the universe. This expansion is something which most astronomers now believe to be happening. It is not producing any obvious effects like the sun or moon getting farther away from us, because it only becomes noticeable over very much larger distances than that. Imagine a pudding swelling as it rises: any two currants close together in the middle will not get very much farther apart, but the currants on or near the outside edge of the pudding will move away from one another much more rapidly.

That is the sort of expansion that seems to be taking place in the universe. The nearest stars do not seem to be moving away from us at all; but the more distant ones do, and the very farthest seem to be moving away very fast indeed—many hundreds of miles every second. And the farther away they get the faster they seem to go, until at a certain point about 40,000,000,000,000,000,000

miles away they are going so fast that we cannot possibly see them, since they are travelling away from us faster than their light can travel to us.

Now if this is happening, the universe seen from a giant's-eye view would be getting more and more thinly populated with stars all the time, while on the other hand there must have been a time, not very long as astronomers' thinking goes (just a few thousand million years ago!)—when all the stars in the universe were packed very close together, producing a most unusual state of affairs, with gravity behaving like nobody's business.

This in fact is what the majority of astronomers do believe to be the case. They think there was a moment, some 6,000,000,000 years ago, when the universe literally started off, exploding with a bang, and its pieces have gone on flying apart ever since. Significantly the age of our own planet, estimated from the study of rocks and other things, appears to be about the same as this—say 4,000,000,000 years. It looks, in fact, as if there may have been a single “day of creation” for the universe.

But the young physicists who hold the continuous creation theory refuse to believe this. They think that there was not one absolute beginning to the universe, but rather that new matter is continually coming into existence all

the time everywhere to balance the thinning out due to expansion. The new matter need only come into existence in the very small quantities already mentioned, because the visible universe is so vast that over all of it the total will still be enormous—100,000,000,000,000,000,000,000,000 tons every second.

It will of course be created as individual atoms, most of which will appear in empty space; but these will in due course be swept together to form new stars—astronomers know that “empty” space in fact contains a great deal of thin gaseous matter that is being swept together into stars all the time. This means that, by and large, the universe from the giant's-eye view has always looked much the

same, and always will, although there will be local differences here and there as new stars appear or old stars burst.

Which of these views is correct? Can anybody ever tell? Obviously not, directly, because the processes in question all lie entirely outside the reach of ordinary observation. But that applies to a good many processes studied by scientists. Theories about such processes are proved or disproved because in due course someone discovers *logical consequences* of these theories which can be tested, and that is what both sides in the current dispute about the universe are hoping for.

In the meantime, the dispute is conducted on philosophical grounds. Most physicists hold that the continuous creation theory is a betrayal of all the best scientific traditions, since it contradicts the fundamental rule that matter-energy cannot be created or destroyed, and does so without any adequate evidence at all.

The upholders of the theory have a very cunning answer, however. They say that they are really being much truer to the traditions of science than anyone else (and in the absence of clear evidence scientists can only try to have the courage of their convictions). For, they say, if science is really determined to test everything by observation, then it will

not make assertions about the existence of matter or energy that cannot be observed. Its basic rule, therefore, ought not to be that matter and energy are conserved—that would be metaphysical dogma—but that *within the range of our possible observations* the total amount of matter and energy is always the same. But stars that are travelling away from us faster than light cannot ever be observed, so they might as well not exist: and so there must be new matter coming into existence all the time, or the basic rule will not be obeyed.

This may sound far-fetched, but less likely theories have proved true in science before now. We can only wait and see.

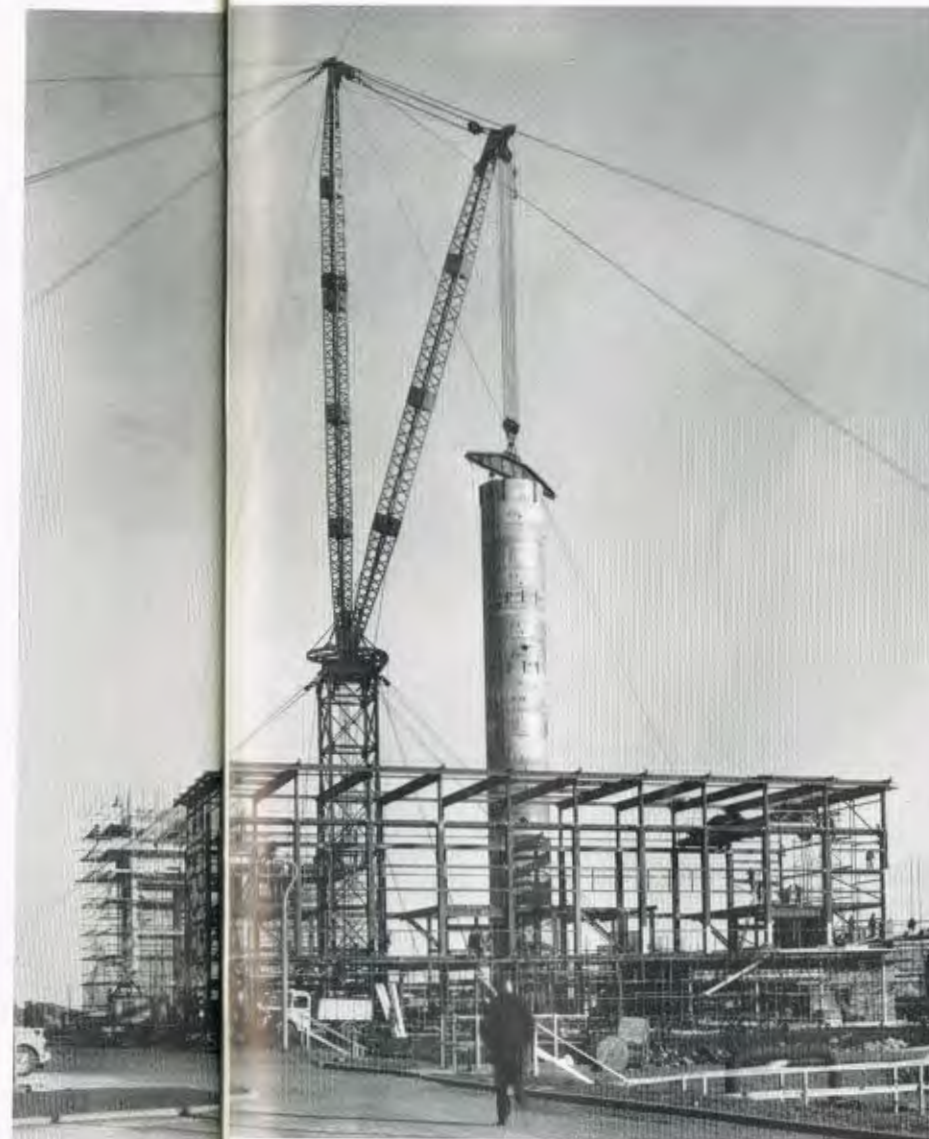


(Photo by courtesy of Mt. Wilson and Palomar Observatories)
New stars form continually inside glowing clouds of gas in space. This is the Orion nebula, visible to the naked eye as a hazy patch.

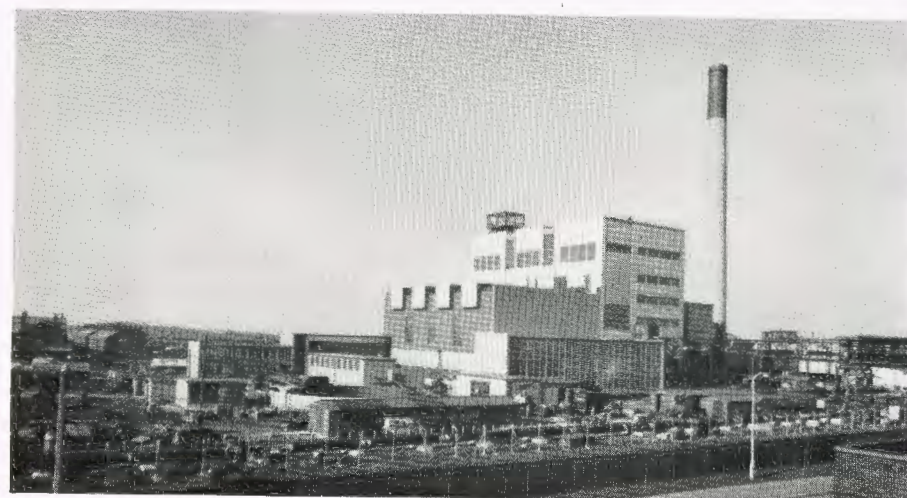
NEWS IN PICTURES



Up she goes! It absorption tower, w Heysham fertilizer



took just 1½ hours to lift into position this 135 ft., 93-ton stainless steel hich forms part of the large-scale extensions being made to the plant. The giant derrick used for the job was previously in use at Calder Hall atomic power station



Brussels Fair. A 'Perspex' carving of the royal coat of arms by Arthur Fleischmann destined for the British Pavilion at the Brussels International Fair, which opens on 17th April, is wrapped in 'Visqueen' film before shipment

Multi-million power station. A recent photograph of the new I.C.I. power station at Thornton Cleveleys, which is scheduled to be in full operation by the end of the year. It will supply steam and power to Hillhouse, Burn Naze and Burn Hall Works



Cement Works "double." In 1957 Casebourne Works cement plant had no lost time accidents, and this record won for them both the Billingham Inter-works Safety Trophy and a cup and plaque (see above) from the British Cement Makers' Federation

New rugby cap. John Herbert of Southern Region Plastics Department was capped for England in the match against France and then selected for the Calcutta Cup match at Murrayfield last month



Cooks exchange. Now working in the Plastics Division's canteen at Welwyn is Fräulein Jegodka, daughter of a Munster, Germany, hotel proprietor. She takes the place of I.C.I. catering trainee Keith Price, who is spending six months at her father's hotel



Mr. F. L. Lightfoot, chargehand turner in the Castner-Kellner Works fitting shop, has completed 50 years' service with the Company. Mr. Lightfoot, who joined Castner-Kellner Works as an apprentice in 1908, has been secretary of the Runcorn No. 1 branch of the A.E.U. for 33 years

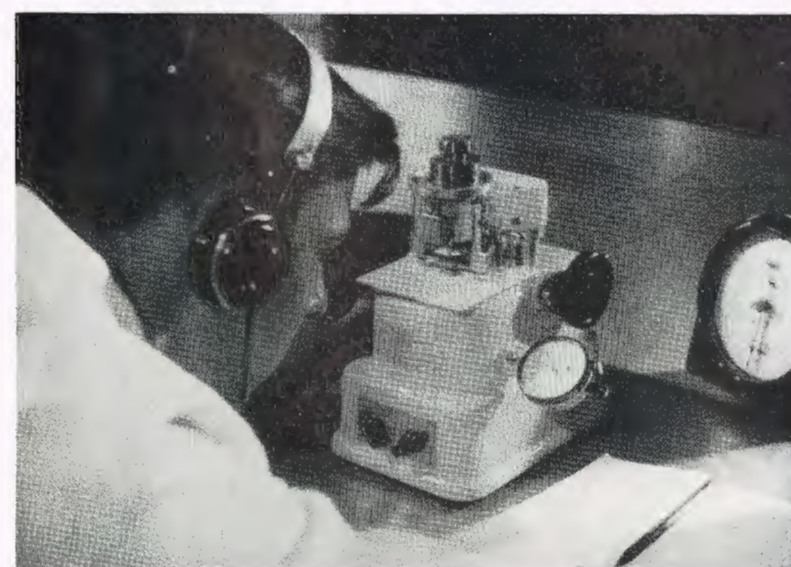


Mr. Tom Fulford, who is 72, has retired after 58 years at Chance and Hunt Works, Oldbury—the whole of the time in the carboy basketmaking department, where he was a chargehand for many years. His father also worked at Chance and Hunt for over 40 years





Toothless wonder. Some of the fashions shown at the recent press reception held to launch Lightning Fasteners' new featherweight 'Nyzip,' which is made with a continuous nylon filament down each side instead of metal teeth. (1) A sequined sackline dress in 'Terylene' satin (Teddy Tinling). (2) A bloomer suit outfit for tennis (Tinling). (3) A luxurious 'Terylene' housecoat which unzips from neck to hem (Jean Radford). (4) Cocktail separates (Digby Morton). Below, left: At Glasnant Factory: Sewing the nylon filament on to the fastener tape.



New paint film. A still from "A Coat of Paint," a new I.C.I. film dealing with the research into paint wear and tear problems which is carried out by Paints Division. Above: In this test a small hemisphere of metal is being forced into the paint film under varying loads



I.C.I. and "the sack." Five pretty girls all done up in fertilizer sacks. This skit on the "sackline" in women's fashion was part of the entertainment at a recent party held by the staff of Billingham Commercial Works. The girls are Kathleen Brown, Pauline Campion, Rosemary Irvine, Brenda Nicholson and Eileen Ludbrooke

Gardening quiz. "Gardeners' Question Time," the B.B.C.'s longest-running quiz programme, was broadcast from Dyestuffs Division's Huddersfield Works on 23rd February. Some 120 gardening enthusiasts plied the panel with questions. The panel of experts: Fred Loads, question master Freddy Grisewood, Professor Alan Gemmell and Bill Sowerbutts



Bound for Labrador. Two Billingham engineering apprentices, Richard Hirst and Trevor Millington, are among the 50 boys chosen to go on a six-week expedition to northern Labrador arranged by the Schools Exploring Society



New agricultural laboratories. A new laboratory block at Plant Protection Ltd., Yalding, was completed in February. Special features introduced to safeguard the health of workers dealing with highly toxic chemicals include this "spaceman" suit



Polish planners see Wilton. Four members of the Polish Economic Planning Commission spent a day at Wilton during their visit to Britain last month. Above: Mr. J. C. H. McEntee, Wilton chairman (fourth from left), explaining the site model



PICTURES FROM OVERSEAS



Australia. Mr. Macmillan serves steak to two Queensland policemen during a barbecue at I.C.I.A.N.Z.'s cattle tick research station at D'Aguilar, near Brisbane, during his Queensland tour. Entomologist Lionel Webber, who is in charge of the station, looks on. To commemorate the visit Mr. Macmillan and Lady Dorothy each planted a poinciana tree on the station. Left: In the cattle tick laboratory. The test tube under the microscope contains approximately 40,000 live ticks bred in the laboratory. The station covers 100 acres and includes experimental cattle dips. (Photo: Brisbane Courier-Mail)



Canada. The new multi-million dollar C.I.L. ammonia plant at Millhaven, Ontario, shines brightly in the light of the plant flare. Capacity of the new plant is 200 tons a day, which makes it the largest ammonia manufacturing works in eastern Canada



Pakistan. The Chairman takes tea with the I.C.I. (Pakistan) staff at Chittagong in East Pakistan. This was the first visit of an I.C.I. chairman to this office. (See story on page 117.)



Canada. Which twin has the 'Terylene'? Modelling fur coats at McGill University, Montreal, are Margaret and Caroline Smart, twin daughters of Mr. S. J. Smart, general manager of C.I.L.'s Ammunition Division. Coat on the right is made of 'Terylene'

In Low Gear

By W. M. Steele

Drawing by Evelyn Cooke

Obtaining a driver's licence in Italy is quite a business for a foreigner. But if you have an aptitude for form-filling and the patience, you will get one in the end.

IT was Christmas Eve when we were presented with our lovely blue Italian drivers' licences, Grade 1. They gave us a genuine thrill. We had worked for them.

If you've been in Italy long enough to apply for a driving licence, you've been there long enough to know that it's going to be a slow process. When my wife and I called at the Automobile Club for initial guidance we put ourselves into low gear and got precise details (so we thought) of everything required by the police.

First—photographs. We found a photographer in the village and had our pictures taken. When would they be ready? "*Domani.*" Tomorrow. It was the first time we heard this word during the Battle of the Licences—but not the last.

Next—medical and residential certificates. Both were said to be obtainable from the local town hall. Luckily we had a chum there who smoothed our way considerably, but even so it was pretty stony. The four forms we needed cost 1s. 6d. each, and to get them we had to go to the salt and tobacco store.

We consigned them to the civic authorities for preparation and began once again the job of completing a fifteen-column form. We had done this several times before for the same team, but for different reasons.



"Can you see?" he asked. "Si," we replied. It was enough.

Our names, our children's names, our parents' names, our mothers' maiden names, plus a few more columns for lesser gossip. The doctor wasn't in, so it was a case of—tomorrow.

I drew up a letter to our representative at Rome, explaining that the authorities wanted something official from him to support our applications—something to the effect that we were pleasing people. This letter went off to the Eternal City and we prepared to renew what soon gave every sign of being the eternal struggle.

Back at the town hall next day we presented the photographs. After a slight check, during which we went out and did the day's shopping, we were ushered into the doctor's room. To our relief he proved to be a man of action. "Can you see?" he asked. "Si," we replied. It was enough; we were through. Two minutes. Tomorrow.

After a couple of days we nerved ourselves for the next development and got a pleasant shock: two lovely certificates each, for the cost of 30s., one residential and the other medical, each bearing our photographs and the town seal—mighty impressive, especially the medical.

Obviously a fellow of discernment, that doctor, for he had summed me up swiftly and thoroughly in those two minutes: man of 1.9 metres, robust

constitution free from organic imperfection, without trace of being addicted to drink or drugs, eyesight perfect, and able to hear conversation from eight paces at each side. I felt better already.

The expected letter from Rome arrived and we could hardly wait to get to the Automobile Club. But as soon as our nice friend there began with the words "I'm sorry" we knew that we were still far from the end.

It appeared that one or two little matters still required attention. For example, the doctor's certificate had to be countersigned by the mayor. And quite right, too; a masterpiece like that deserved to be countersigned.

Then, that letter from Rome. Could it be written in Italian? Could there be a letter for each of us, instead of one covering both? Finally, would the Minister mind stating that we had never been in gaol? *Grazie.*

We went away just a shade depressed, but soon recovered our form. Yes, the mayor would gladly add his endorsement, if we would supply two duty stamps obtainable from we knew where. Another 1s. 6d. and back with the stamps. We came away happily bearing the certificates, now in proper shape.

Our worthy Minister in Rome played his part, responding most promptly with everything asked for. Only he varied slightly the wording I had requested, stating that "as far as he knew" there had never been penal proceedings against us.

Trudging up the stairs to the Automobile Club I deliberately made my mind blank—I was prepared for anything, and would take it on the chin.

Our papers were well received and the club's blessing given to them. My friend took them through a mysterious door leading to an office where, as far as I could gather, the police had a branch—most handy. I was requested to "have patience" and had it for an hour. Then my friend returned with two elegant pink forms bearing our photographs and stamped by the



Courage and persistence eventually bring their reward—a licence, signed, countersigned, stamped in two places, and valid for six months

Ministry of Transport. I licked my lips in anticipation, but they merely authorised us to attend an examination—and cost £2.

We managed to pass, first answering a few questions about road signs and then having a short driving test. We were pronounced satisfactory and informed that the licences would be available in about a week.

We gave them ten days and then went to the Automobile Club, where we received a big cheer. They were obviously pleased with us and said that the licences awaited us at the police station.

When I called there, I was actually shown the licences. But they were put away smartly, and I was led to understand that we had to apply for their release.

I knew the drill and performed it like a robot—out to the salt store and back with the forms and duty stamps. Then at the policeman's dictation we solemnly applied for the release of the previous licences. This time we got in first: "*Domani?*" He nodded.

The next day we really did get the licences. But the game was still on. Across the top of each was scrawled "Valid for six months," and in order to have this endorsement cancelled in six months we would have to apply to the Department of Justice in Rome for a "penal certificate." We would just have to behave ourselves in the meantime.



"Fountain of the Naiads"

Photo by P. F. Bowles (Brixham)